

MOLECULAR BIOPHYSICS (LS643A)

AK Saxena* and S Gourinath

S. No	Topics	Contact hours	Faculty
1.	Primary, secondary, tertiary and quaternary structures of Proteins and Nucleic acids	2	SGN/AKS
2.	Forces that determine Biological structure and Function: Review of Thermodynamics, Electrostatics, Hydrophobic effects	2	AKS
3.	Structure based function predictions, Possibilities and Limitations	2	AKS
4.	Membrane protein- structure- function relationship, Biological Membranes, Membrane protein structures- How membrane Shape protein structure	2	AKS
5.	Membrane protein folding and stability, Formation of alpha-helical Sheet, Classification of membrane protein	2	AKS
6.	X- ray diffraction methods- problems and achievements	4	AKS
7.	Biophysical techniques: CD, NMR, Patch clamp method, SPR	4	AKS
8.	Protein-protein interactions: Structural prospective, structure based prediction	2	SGN
9.	Structural prospective of protein-protein interactions: detailed examples of Antigen-anti body, enzyme-substrate, cellular signalling proteins	2	SGN
10.	Protein recognition of DNA: structural prospective with examples of bacteriophage transcription factors and regulation	2	SGN
11.	Protein recognition of DNA: how prokaryotic transcription factors bind DNA and regulate transcription	2	SGN
12.	Eukaryotic transcriptional factors with unusual structural motifs and their binding of DNA	2	SGN
13.	Drugs by design : basic principles with example of Purine Nucleoside Phosphorylase (PNP) inhibitor design	2	SGN
14.	Structures of HIV protease and reverse transcriptase and their inhibitor design	2	SGN
15	Drug discovery trials for COVID	1	SGN

Suggested Reading :

1. Principles of physical Biochemistry, van Holde, KE , Johnson, WC, Ho, PS
Prentice Hall, Inc.,1998.
2. Proteins, Creighton, TE. ; WH Freeman & Co., 1993
3. Crystallography Made Crystal Clear: A Guide for User's of Macromolecular Models, Rhodes, G.; Academic Press, 1999
4. Techniques for the Study of Biological Structures and Function, Vol 2, Candor, CR and Schimmel, PR; WH Freeman & Co., 1990
5. Random walks in Biology, Berg, HC; Princeton University Press, 1993